

WEST Search History

Hide Items

Restore

Clear

Cancel

DATE: Monday, March 22, 2004

Hide?	Set Name	Query	Hit Count
		<i>DB=USPT; PLUR=YES; OP=ADJ</i>	
<input type="checkbox"/>	L6	l3[ti,ab]	2
<input type="checkbox"/>	L5	l3 and L4	1
<input type="checkbox"/>	L4	(707/3 or 707/4).ccs.	3104
<input type="checkbox"/>	L3	l1 same (bluetooth or (blue tooth) or wap or ((wireless or (wire less)) adj (application or access\$) adj protocol) or (global system mobile) or ((wireless or (wire less)) adj markup adj language))	43
<input type="checkbox"/>	L2	L1[ti,ab]	402
<input type="checkbox"/>	L1	(wireless\$ or (wire less\$) or mobil\$ or palm\$ or bluetooth\$ or (blue tooth\$) or portab\$ or laptop\$ or (lap top) or handheld\$ or (hand held\$) or infrared\$) near12 (search\$ or quer\$)	3793

END OF SEARCH HISTORY



US006529903B2

(12) **United States Patent**
Smith et al.

(10) **Patent No.:** **US 6,529,903 B2**
(45) Date of Patent: **Mar. 4, 2003**

(54) **METHODS AND APPARATUS FOR USING A MODIFIED INDEX TO PROVIDE SEARCH RESULTS IN RESPONSE TO AN AMBIGUOUS SEARCH QUERY**

(75) **Inventors:** **Benjamin Thomas Smith**, Mountain View, CA (US); **Sergey Brin**, Palo Alto, CA (US); **Sanjay Ghemawat**, Mountain View, CA (US); **Christopher D. Manning**, Palo Alto, CA (US)

(73) **Assignee:** **Google, Inc.**, Mountain View, CA (US)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 214 days.

(21) **Appl. No.:** **09/748,833**

(22) **Filed:** **Dec. 26, 2000**

(65) **Prior Publication Data**

US 2002/0042791 A1 Apr. 11, 2002

Related U.S. Application Data

(60) Provisional application No. 60/216,530, filed on Jul. 6, 2000.

(51) **Int. Cl.⁷** **G06F 17/30**

(52) **U.S. Cl.** **707/7; 707/5; 707/3**

(58) **Field of Search** **707/7, 5, 3, 100, 707/101**

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,495,608 A * 2/1996 Antoshenkov 707/1

5,701,469 A * 12/1997 Brandli et al. 707/102
 5,745,894 A * 4/1998 Burrows et al. 707/5
 5,758,145 A * 5/1998 Bhargava et al. 707/2
 5,845,273 A * 12/1998 Jindal 707/1
 5,915,251 A * 6/1999 Burrows et al. 707/102
 5,953,073 A * 9/1999 Kozina et al. 348/558
 5,978,792 A * 11/1999 Bhargava et al. 707/2
 6,026,411 A * 2/2000 Delp 707/104
 6,038,365 A * 3/2000 Yamagami 707/6
 6,169,999 B1 * 1/2001 Kanno 707/532
 6,353,820 B1 * 4/2002 Edwards 707/2
 6,377,961 B1 * 4/2002 Ryu 707/100
 6,421,662 B1 * 7/2002 Karten 707/3

OTHER PUBLICATIONS

Santuci et al., A Hypertabular Visualizer of Query Results, 1977, IEEE, pp. 189-196.*

Graefe et al., The Microsoft Relational Engine, 1996, IEEE, Pates 160-161.*

* cited by examiner

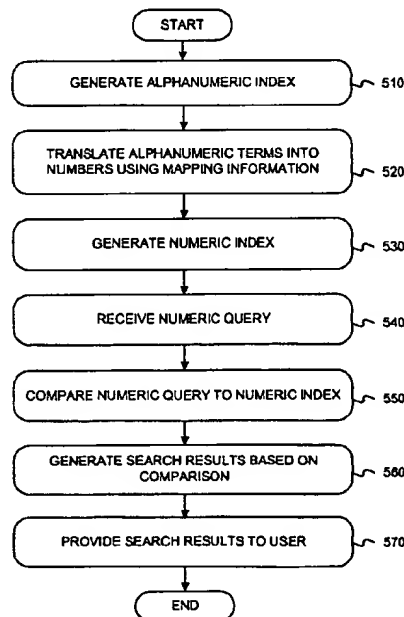
Primary Examiner—Frantz Coby

(74) *Attorney, Agent, or Firm*—Straub & Pokotylo; John C. Pokotylo

(57) **ABSTRACT**

A system allows a user to submit an ambiguous search query and to receive potentially disambiguated search results. In one implementation, a search engine's conventional alphanumeric index is translated into a second index that is ambiguous in the same manner as which the user's input is ambiguous. The user's ambiguous search query is compared to this ambiguous index, and the corresponding documents are provided to the user as search results.

21 Claims, 8 Drawing Sheets



[First Hit](#) [Fwd Refs](#)**End of Result Set**

Generate Collection

Print

L5: Entry 1 of 1

File: USPT

Mar 4, 2003

DOCUMENT-IDENTIFIER: US 6529903 B2

TITLE: Methods and apparatus for using a modified index to provide search results in response to an ambiguous search query

Brief Summary Text (5):

Most search engines operate under the assumption that the end user is entering search queries using something like a conventional keyboard, where the input of alphanumeric strings is not difficult. As small devices become more common, however, this assumption is not always valid. For example, users may query search engines using a wireless telephone that supports the WAP (Wireless Application Protocol) standard. Devices such as wireless telephones typically have a data input interface wherein a particular action by the user (e.g., pressing a key) may correspond to more than one alphanumeric character. A detailed description of WAP architecture is available at <http://www1.wapforum.org/tech/documents/SPEC-WAPArch-19980439.pdf> ("WAP 100 Wireless Application Protocol Architecture Specification").

Current US Cross Reference Classification (1):707/3